

ABSTRACT OF THE DISCLOSURE

[00048] An improved gas precursor delivery system for a deposition chamber is disclosed. The system includes, in a preferred embodiment, a shower head containing holes through which the gas precursors will be delivered to the deposition chamber. Each hole within the shower head has associated with it a flow regulating micromachine, such as a microvalve or micropump, for independently regulating the flow of the precursor into the deposition chamber, and if necessary, for vaporizing the source chemical. Each micromachine is preferably associated with a single precursor source, and hence precursor lines are not shared and thus do not need to be purged with the introduction of each new precursor, saving manufacturing time and decreasing wasted precursor gas. Precise control of precursors into the chamber via the micromachines allows film stoichiometry and thickness to be carefully controlled.